Center for Advanced Energy Studies
CAES In Review
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Building for CAES Advances Toward Construction

By Doyle Batt

Plans for constructing the first new building on the joint INL Science and Technology and University Campus and the home for the Center for Advanced Energy Studies are progressing with completion expected in the summer of 2008.

Carol Johnson, INL's director for Infrastructure, Optimization, Integration and Planning, emphasized that "The Center for Advanced Energy Studies facility will be the first visible step in the development of the joint Science and Technology and University Campus. It will be an exceptional facility where research and education will support the missions of the INL and the three partnering universities in Idaho."

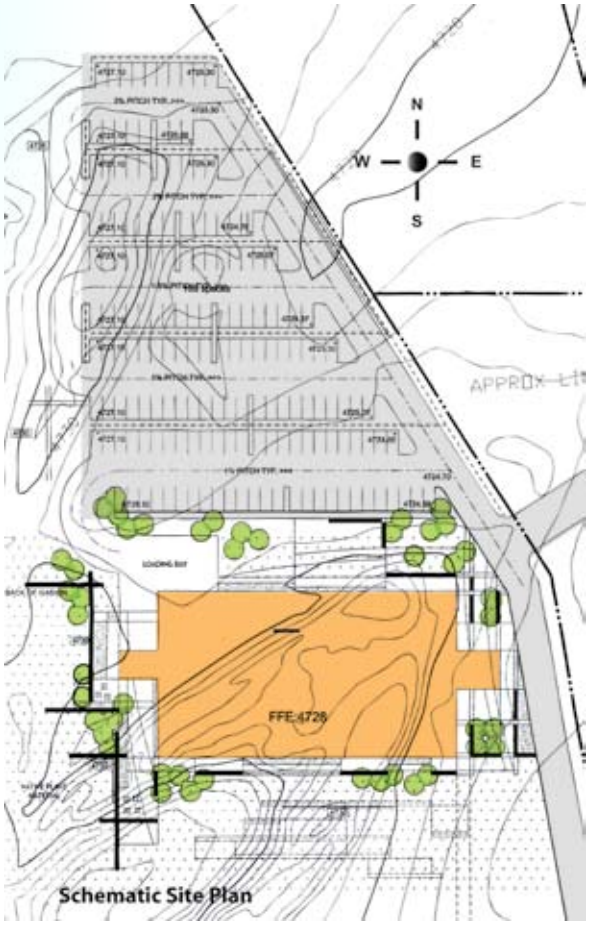
Currently, Boise State University, Idaho State University, University of Idaho and INL are working together to identify requirements for the building designers. The building will be located on Idaho state property north of the Center for Higher Education at University Place and west of INL's Engineering Research Office Building.

Design specifications call for a 55,000-square-foot, state-of-the-art research building with offices, research laboratories, and collaboration spaces. The laboratories will support research in material sciences, chemistry, radiochemistry, and system modeling. The project manager for this state-and university-owned building is Jim Szatkowski from the Idaho Division of Public Works. Big-D Construction from Salt Lake City was chosen by the state as the design-build developer of this new facility.

Earlier this fiscal year, the State Board of Education approved the design and development phase and anticipates receiving the final design in late November or early December 2006. A decision on beginning construction will be made then. Currently, construction of the building is scheduled to begin in late March 2007 with completion scheduled for the summer of 2008. As a state-of-the-art high-performance facility, this building is being designed to be very energy efficient and will seek to obtain a LEED™ Silver Certification. Funding for this facility is from two federal HUD grants, a Settlement Agreement Fund and from a bond which will be repaid through the lease of part of the facility by INL.

"Operating as a joint institute, CAES will permit co-location of those involved in energy research, while maximizing the use of energy-related capabilities at member institutions," said Interim CAES Director Harold Blackman.

INL received a congressional appropriation for $2.5 million to install a roadway, named "University Boulevard," and utilities to CAES and future INL and university buildings. The first 980 feet of the corridor have been started and the boulevard will be completed during FY-2007.



Schematic Site Plan

CAES Center for Advanced Energy Studies

CAES Update

By Harold Blackman, Interim Director CAES

The next 18 months will be extremely important to the development of an effective Center for Advanced Energy Studies. After assuming the position of director, I visited each of our partner universities and discovered that they are very positive about CAES. The university presidents, department faculty and students are excited about collaborating with INL within CAES, pursuing more research opportunities and advancing students in a wide variety of energy studies.

In response to their enthusiasm, we want to facilitate a collaborative environment that builds strong relationships and expands the reputation of the CAES partnerships involving INL, Boise State University, Idaho State University, and University of Idaho. Through research, academic advancements, industrial work force development and policy study and formulation, CAES is working hard in "collaborating on energy."

Recently, I visited Washington, D.C. and met with members of the Idaho congressional delegation, their staffs and DOE headquarters staff. Rep. Mike Simpson emphasized his support for CAES and its collaborative efforts, while Sen. Larry Craig underscored his "personal interest" in establishing successful relationships among the four partners in CAES. It became clear from DOE staff that they expect CAES to explore the myriad of energy issues and offer a vital window in analyzing policy possibilities.

Based on our focused business plans, we will be holding a series of strategic planning efforts with our university partners to advance CAES. Only by having the partners agree on strategy can we begin to synchronize our tactical approaches.

Planning for the CAES building, which-when completed-will greatly enhance these collaborative opportunities, continues to advance (see the accompanying article in this issue). Idaho's State Board of Education meets on Nov. 30 to consider the proposal. Construction may well begin in the spring and the scheduled completion of the building at 1000 University Blvd. is July 2008.

Let me clearly restate the purpose of CAES. It is a collaborative and facilitative organization that quite simply is designed to help INL accomplish its missions in energy and advance the three partner universities by bringing energy-related research to them in a way that produces successful graduate students. This requires CAES to build strong, trusting relationships among the partners, while keeping an eye on the swirl of issues in an energy-hungry world.

BSU Student Receives AFCI Fellowship

From a DOE News Release, August, 2006

Brian Jaques, a Boise State University student in material science and engineering, is among those named to receive a $42,500 fellowship as part of the Advanced Fuel Cycle Initiative, according to a DOE news release.

Upon receiving the fellowship, Jaques said, "I am honored to be recognized with such a prestigious award from such a prominent organization. I am very excited to participate in the advancement of nuclear science and technologies."

His professor at BSU, Darryl P. Butt, said, "This is a positive reflection on Boise State and our growing materials program, but a special honor for Brian. He is a very enthusiastic graduate student. I'm certain he'll contribute significantly to the AFCI program through his research at BSU and INL."

To help meet the growing demand for nuclear-educated scientists and engineers, and to build upon President Bush's American Competitiveness Initiative, the U.S. Department of Energy (DOE) on Aug. 23 announced it will award a total of $510,000 in fellowships to 12 graduate students who are studying the nuclear fuel cycle. Each fellowship is valued at $42,500 and was awarded under the Advanced Fuel Cycle Initiative (AFCI) - a program within DOE's Office of Nuclear Energy - geared toward looking at ways to close the nuclear fuel cycle and recycle components of used nuclear reactor fuel.

"These fellowships help further President Bush's American Competitiveness Initiative by providing our next generation with the education and skills necessary to compete in today's global marketplace," DOE Assistant Secretary for Nuclear Energy Dennis Spurgeon said. "We congratulate these fellows, and are thrilled that some of the nation's best and brightest students from U.S. graduate schools are committed to studying the fuel cycle, an area critical to the growth of the nuclear industry."

Other students selected for this fellowship were from University of California – Santa Barbara, University of Missouri – Rolla, University of Michigan, North Carolina State University, University of Wisconsin – Madison, Texas A&M University, University of California – Berkeley, Ohio State University, Massachusetts Institute of Technology, Georgia Institute of Technology, and Kansas State University.

Mary Lou Dunzik Gougar, representing Idaho State University's Institute of Nuclear Science and Engineering, addresses the more than 50 participants attending the Idaho Fuel Cycle Workshop concerning key issues in fuel design, development and production.

Idaho Fuel Cycle Workshop Held in Idaho Falls

By Keith Arterburn

The Idaho Universities Consortium, which is composed of the University of Idaho, Boise State University and Idaho State University, and the ISU Institute of Nuclear Science and Engineering hosted more than 50 participants at the Idaho Fuel Cycle Academic Center of Excellence Workshop at University Place in Idaho Falls Aug. 2 and 3.

The two-day conference included a lengthy series of technical discussions; an exchange of capabilities among institutions represented, and extended tours of Idaho National Laboratory facilities, including INL Research Center and the Materials and Fuels Complex on the 890-square-mile Department of Energy research site. Idaho National Laboratory and the Center for Advanced Energy Studies sponsored the event, which included participants from Boise State University, Idaho State University, Ohio State University, Oregon State University, the University of Nevada-Las Vegas and University of Idaho, as well as INL.

After brief welcoming remarks by Mike Lineberry, Director of INSE, and Leonard Bond, Director of CAES, participants discussed INL fuel cycle activities, aqueous separations technologies, nuclear fuels development, pyrochemical separations, materials characterizations, and non-proliferation issues. They also received brief overviews of expanding capabilities at each of the Idaho research and engineering universities.

"This fuel cycle workshop was an excellent start in learning about the status of research, getting familiar with important facilities that are available for research and determining the capabilities of our potential partners on specific projects," said Mike Goff, INL's Fuel Cycle Programs Director.

Biennial conferences to be held

International Pyroprocessing Research Conference held in Idaho Falls

By Keith Arterburn

The Center for Advanced Energy Studies hosted more than 75 participants at the 2006 International Pyroprocessing Research Conference, which was held Aug. 8-10 at University Place in Idaho Falls.

Mike Simpson from INL's pyroprocessing technology department organized the conference and noted that it attracted attendees from seven nations. The three-day conference included technical presentations and extended discussions concerning pyrochemical treatment of spent nuclear fuel. Pyroprocessing is a promising technology for closing the nuclear fuel cycle and enhancing proliferation resistance of fuels, especially for fast reactors. It also offers the ability to process spent fuel with a high heat load and high enrichment, while performing all of the needed separations in a compact fuel cycle facility.

Interest in pyroprocessing has been renewed because of the U.S. Department of Energy's new nuclear initiative, Global Nuclear Energy Partnership (also called GNEP), which envisions recycling of nuclear fuel materials in the U.S. INL's Chief Research Officer, Bill Rogers, noted that "Pyroprocessing is a key component to the technology development plans for GNEP. INL's historical roots in the

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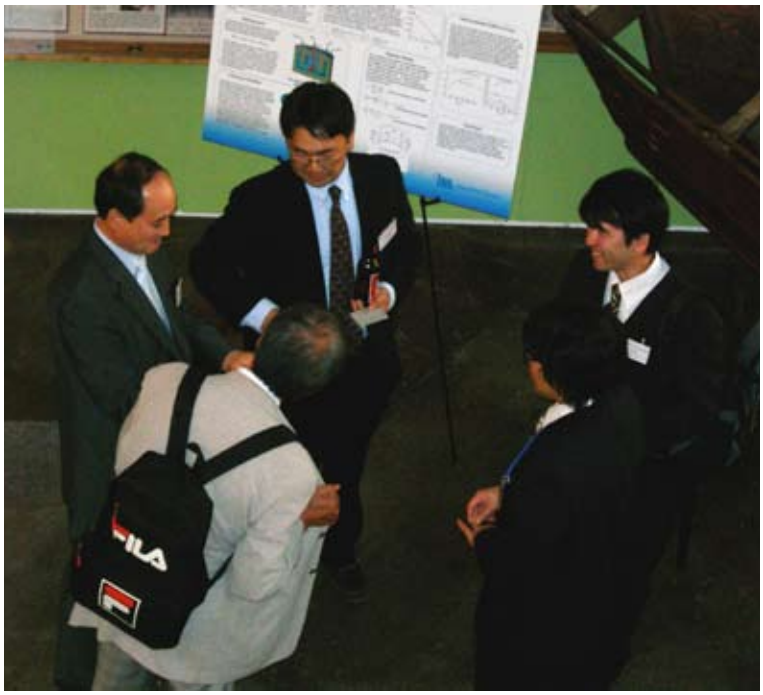

Representatives from seven nations attended the three-day pyroprocessing research conference Aug. 8-10, 2006.

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process development and testing at the Integral Fast Reactor and Experimental Breeder Reactor II make it the right place to hold the first of these conferences." Building upon the success of this first forum, Seong Won Park from the Korean Atomic Energy Research Institute announced that South Korea will host the next conference in 2008. Conferences are designed to bring together researchers in this field from around the globe to share information on their latest advancements and build informal collaborations, and they will be held every other year.

More than 75 participants attended the first biennial pyroprocessing research conference in Idaho Fall on Aug. 8-10, 2006.

CAES Launches Three LDRD Efforts

By Keith Arterburn

The Center for Advanced Energy Studies is collaborating with Idaho university researchers on three Laboratory Directed Research and Development (LDRD) projects, which will explore materials and their behaviors under specific conditions.

"We are excited to be initiating our first CAES series of LDRD-sponsored research with Idaho universities," said Kevin Kostelnik, deputy director of CAES. "Expanding materials research that directly supports inquiries into energy systems is a principal interest of CAES. Combining the talents of researchers at our universities and the laboratory will allow us to more rapidly advance these efforts."

Two projects from the University of Idaho will increase knowledge of the phase change behavior of material with internal heat generation and the characteristics of oxygen-permeable membranes, both of which support further understanding of energy systems and materials. A third project is with Boise State University and is designed to investigate hydrogen production using photosynthetic processes.

University of Idaho researcher John Crepeau, an associate professor of mechanical engineering in Idaho Falls, is collaborating with INL's Ali Siapush who works in Applied Mechanics and Sustainable Design on investigating internal heat generation. They will conduct a series of experiments to determine the solid-liquid phase changes of materials that generate heat. In these experiments, the team will use INL's X-ray computed tomography equipment to measure the solidification thickness of materials to determine the relationship between thickness and internal heat generation. The results will be compared to analytical and computational models. This will assist in further understanding nuclear fuel processing and manufacturing, as well as modeling of the behavior of core materials in reactors.

In Idaho Falls, University of Idaho principal investigator Vivek Utgikar, an assistant professor of chemical engineering, is working with INL's Thomas Lillo from Material Sciences to characterize oxygen-permeable membrane materials. This research will advance understanding of materials for application in advanced energy systems and hydrogen production. Specifically, this investigation will help advance the creation of materials that may enable hydrogen fuel cell operations at lower temperatures using alternative thermochemical cycles.

With Boise State University, the LDRD project involves Kevin Feris, assistant professor of biology, and INL researcher Joni Barnes from Life and Earth Sciences. An experienced microbial ecologist, Feris will be the principal investigator in researching the development of a novel multi-species photosynthetic anaerobic hydrogen-producing system to determine its productivity levels and compare them to others. This project will provide key insight to hydrogen-dependent electricity production by a photosynthetic microbial fuel cell.

These LDRD projects reaffirm the long-established research and collaborative relationships between INL and Idaho universities, but also address many of the key challenges in energy research in a time of demand for new technologies and systems.